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PAST. PSEUDOTUBERCULOSIS AND THE SALMONELLA GROUP

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THE DIAGNOSTIC IMPORTANCE OF THE ANTIGENIC CORRELATION BETWEEN
PAST. PSEUDOTUBERCULOSIS AND THE SALMONELLA GROUP

[Following is the translation of an article by Werner Knapp, a special reprint from Zentralblatt für Bakteriologie, Parasitenkunde Infektionskrankheiten und Hygiene (Central publication for bacteriology, parasite studies, infectious diseases, and hygiene), I Orig. 164, Stuttgart, 1955, pages 57-59.]

In various articles we were able to report about Past. pseudotuberculosis as an irritant of mesenterial lymphadenitis which often occurs in adolescents with the clinical symptoms of acute appendicitis, and to point out the necessity of serological examinations to ensure the clinical and histological diagnosis.

Further studies of the occurrence of antibodies against Past. pseudotuberculosis in the serum of healthy and sick people revealed that frequently strains (which Thal had subordinated in the serological group IV and kindly given to us) became agglutinated through the serum of typhoid patients and of those who had been vaccinated for the prevention of typhoid, without the presence of a basis for a Past. pseudotuberculosis infection. In two children, who had been ill for some time, the agglutination of these Pasteurella strains lead to a serological suspected typhoid diagnosis which was later confirmed by the agglutination of S. typhi and the further clinical process. These observations lead to the question as to whether there is an antigenic correlation between Past. pseudotuberculosis and the Salmonella D group, and what consideration should be given to the correlation with the Salmonella B group, as described by Schutze, in the serodiagnosis of this Pasteurella infection.

Schutze's tests (1928) resulted in four different groups, I-IV, in their O-antigen, but not in the H-antigen. Thal reported (1954) five serological groups; of these only groups I, II, and III coincided with Schutze's. A comparison of his group IV and V strains and Schutze's only strain of group IV was impossible, since this strain no longer seems to be available either here or abroad. Since the group IV strains described by Thal differ in their O and H antigen from the representatives of the other groups, their identity with the strain of group IV as described by Schutze may be excluded.

As already mentioned, Schutze has reported on the antigenic correlation between Past. pseudotuberculosis of the serological group II and the Salmonella B group. Kaufmann found them given to factor IV, which led to the discovery of its complex nature IV₁ and IV₂. In 1954 Thal was able to report only on the antigenic relationship to the Salmonella B group. Pirotsky's 1937 description of the antigenic correlation between the Pasteurella group and the Salmonella D group was based on the

observation of two strains of *Pasteurella multocida*.

Through crosswise agglutination and absorption experiments in saturated and unsaturated O immune serum which was gained with strains of the *Salmonella* D group and of *Past. pseudotuberculosis* group IV, we tried to find proof of mutual antigenic relations. Chart 1 shows an example of these experiments, while chart 2 gives the agglutination results in saturated and unsaturated serum of patients with an unclear clinical diagnosis.

Chart 1

Crosswise reactions between *Past. pseudotuberculosis* Group IV and *Salmonella* Group D

Antigens	Antiserum			
	Unsaturated		Saturated	
	Serum No 582 Past. pstbc. Strain 32 ^{IV} 2½ hours 100°	Serum No 785 OD R-Instrm. (Salm. gal- linarum)	Serum No 582 saturated S typhi O (1bd)	Serum No 785 Saturated Past. pstbc. Strain 32 ^{IV} 1bd
<i>Past. pseudotuberculosis</i>				
Group I (St. 2)	---	---	---	---
Group II (St. 16)	---	---	---	---
Group III (St. 2200)	---	---	---	---
Group IV (St. 32)	1:1600	1:1600	1:1600	---
Group V (St. 25)	---	---	---	---
S. Typhi O	1:800	1:800	---	1:200
S. Typhi Vi	---	---	---	---

Chart 2

Agglutination results in patients' serum with Past. pseudotuberculosis and S typhi O

Pat. serum number Suspected clinical diagnosis	Serum pre- examination	Agglutination of Past. pseudo- <u>tuberculosis</u>					S. typhi O
		Group					
		I	II	III	IV	V	
No 7517 Typhoid	without	-	-	-	1: 800	-	1:1600
	sat. with Past. pstbc. St. 32 ^{IV}	-	-	-	-	-	1: 400
	sat. with S. typhi O	-	-	-	-	-	-
No 7438 mesenterial	without	-	-	-	1:1600	-	1:3200
	sat. with Past. pstbc. St. 32 ^{IV}	-	-	-	-	-	1:1600
lymphadenitis	sat. with S. typhi O	-	-	-	-	-	-
No 6902 mesenterial	without	-	-	-	1: 400	-	1: 800
	sat. with Past. pstbc. St. 32 ^{IV}	-	-	-	-	-	1: 800
lymphadenitis	sat. with S. typhi O	-	-	-	-	-	-

These experiments prove the relationship (which, to the best of our knowledge, has not yet been described) between the O antigen in Past. pseudotuberculosis Group IV and the O antigen IX in the Salmonella D group. Furthermore, our experiments show that the Pasteurella strains of group IV do not possess the full IX antigen, so that the complex nature IX₁ and IX₂ applies to the IX antigen of the Salmonella D group as well.

From the point of view of practical serodiagnosis of mesenterial lymphadenitis which is caused by Past. pseudotuberculosis, our experiments (as previous observations made by Schutze) show that an agglutination of strains in group II and IV at the onset of a Widal reaction with strains of the serological groups I - V does not prove the presence of a Pasteurella infection. Positive results in the Widal reaction (the same applies to antigen analysis in the Gruber reaction) should be

evaluated only with a critical consideration of the antigenic correlation between Past. pseudotuberculosis and the Salmonella group. In doubtful cases, as shown in Chart 2, serum saturation should be used. In our experiments to date, it always led to a confirmation or proof of Salmonella infections, but never to the discovery of human infections with these strains. The question whether the clinical and histological picture of mesenterial lymphadenitis in humans is caused exclusively (as in our cases) by an infection with strains of Past. pseudotuberculosis serological group I, and whether serological reactions may be limited to strains of group I, can be answered satisfactorily only when we have more material on serologically and culturally positive cases (Note).

([Note:] Correction: In the meantime we have succeeded in culturing strains of Past. pseudotuberculosis group V, taken from the mesenterial lymphs of two adolescents who were operated on the suspicion of appendicitis. In another case, without having proved the irritant, we have made in infection with a strain of group II probable.)

Our observations, which have lead to a further discovery in the antigenic correlation between Past. pseudotuberculosis and the Salmonella group -- an important factor in serodiagnosis, show how important it is to prove the irritant in order to confirm the serological diagnosis and to send in undetermined gland and operation material.

Literature may be obtained from the author.

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